**Unit 4 Map (Cellular Respiration)**

Ms. Ottolini, AP Biology

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| **Topic** | **Objective** (with College Board Essential Knowledge’s in Parentheses) | **Specific Learning Target** | **Where did I learn this?**  (What resources should I use to study?) | **How well do I know this?**  (scale of 1 to 3, with 3 indicating a high level of understanding) |
| Life Requires Free Energy | 1. You will be able to explain how organisms obtain and use free energy. | a. You will be able to identify the sun as the ultimate source of free energy for all living things. |  |  |
| b. You will be able to explain how living organisms do not violate the second law of thermodynamics. |  |  |
| c. You will be able to describe the use of energy coupling during cellular respiration. |  |  |
| d. You will be able to identify the three uses of free energy in living organisms and the result of excess vs. insufficient free energy. |  |  |
| Glycolysis, the Formation of Acetyl CoA, and the Krebs Cycle | 2. You will be able to describe the role of glycolysis, the formation of Acetyl CoA, and the Krebs Cycle in cellular respiration. | a. You will be able to identify the overall goal, reactants, and products of each of the three steps identified in Objective #2. |  |  |
| b. You will be able to describe the amount and type of ATP production in each of the three steps. |  |  |
| c. You will be able to describe the reduction of electron carriers (ex: NADH and FADH2) in the last two steps. |  |  |
| d. You will be able to identify the location of each step within the cell or mitochondrion. |  |  |
| e. You will be able to draw and evaluate diagrams of each step. |  |  |
| f. You will be able to describe how different food sources (other than glucose) can be used in cellular respiration. |  |  |
| The Electron Transport Chain and Chemiosmosis | 3. You will be able to describe the role of the electron transport chain and chemiosmosis in the formation of ATP and list the steps involved in these processes. | a. You will be able to identify the electron carriers involved in the process (first NADH and FADH2, then the membrane electron carriers, then oxygen). |  |  |
| b. You will be able to describe the creation and use of the proton motive force during ATP synthesis. |  |  |
| c. You will be able to discuss the mechanism of the ATP synthase protein in the creation of ATP from ADP and Pi. |  |  |
| d. You will be able to compare and contrast substrate-level phosphorylation and oxidative phosphorylation. |  |  |
| e. You will be able to identify the role of oxidation and reduction in the electron transport chain. |  |  |
| f. You will be able to draw and evaluate diagrams of the electron transport chain. |  |  |
| Anaerobic Respiration | 4. You will be able to describe the use of anaerobic respiration in living organisms. | a. You will be able to compare and contrast the starting materials and end products of aerobic vs. anaerobic respiration. |  |  |
| b. You will be able to compare and contrast lactic acid fermentation and alcoholic fermentation. |  |  |
| c. You will be able to identify organisms that use aerobic respiration and each type of anaerobic respiration. |  |  |
| d. You will be able to explain how NAD+ is regenerated in anaerobic respiration. |  |  |